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TECHNICAL MEMORANDUM

Utah Coal Regulatory Program

July 10, 2012

TO: Internal File

THRU: Steve Christensen, Environmental Scientist III/Team Lead SC SQS

FROM: Priscilla Burton, Environmental Scientist III/Soils PB

RE: Construction of Burma Evaporation Basin, Genwal Resources, Inc., Crandall Canyon Mine, C/015/0032, Task #4138

SUMMARY:

The Burma pond application received January 2012 with revision received June 22, 2012 The application is not recommended for approval until the issues identified are resolved. Most of the issues identified in this memo were discussed with Mr. Jay Marshall on July 5, 2012.

There is plenty of space within the 7.32 acre disturbed area. The potential for a broad pile with gentle slopes will be discussed with the soils professional at the time of soil salvage.

R645-301-232.400, Chapter 3, Item g describes an application of 1 T/ac straw mulch to the re-graded surface, followed by 1,000 lbs/ac wood fiber mulch and 500 lbs/ac tackfier. One point of clarification should be made in this application sequence. The 1 ton/acre straw mulch should be incorporated into the replaced soil with surface roughening. [PB]

R645-301-244.100, 1) The plan will include a commitment to cover the sludge with six inches of subsoil and an interim seeding of crested wheatgrass (Agropyron cristatum) during periods of temporary cessation at the Berma Pond site and such treatments will be included in the notice required by R645-301-515.321. **2)** The plan should provide for routine compaction of the waste and covering of the waste as required under R645-301-542.742 to control erosion and air pollution attendant to erosion. [PB]

R645-301-731.300, 1) Prior to approval, there must be a firm commitment in the mining and operations plan for a sampling and monitoring plan for the waste. The present discussion of a sampling plan does not provide a firm commitment, since it is presented as one of five scenarios that "will ultimately unfold " pending the legal resolution of Division Order DO-10A. (Chapter 5, page 2, Item 2). **2)** The plan must state that the accumulated depth of the sludge

deposited at the Burma Pond will be monitored and reported in the annual report and that grab sampling will occur every five years or with every 7.5 inches of accumulated depth. **3)** The plan must state that the grab samples of the waste will be shipped using chain of custody forms, and will be prepared at the laboratory using TCLP Method 1311, and will be analyzed for all RCRA metals using EPA Method 200.7 or 200.8 and will be monitored for hazardous concentrations in accordance with 40 CFR 264.13. **4)** The plan must also state that the grab samples of the accumulated sludge will be taken for analysis of the following metals of agronomic concern: aluminum by Synthetic Precipitation Leaching Procedure (SPLP, SW846 Method 1312) , **and** plant available iron, zinc, and nickle analyzed by DTPA extractable, **and** by the methods described for all parameters listed in the Division's Guidelines for Topsoil and Overburden, Tables 3 & 7. [PB]

TECHNICAL ANALYSIS:

ENVIRONMENTAL RESOURCE INFORMATION

Regulatory Reference: Pub. L 95-87 Sections 507(b), 508(a), and 516(b); 30 CFR 783., et. al.

SOILS RESOURCE INFORMATION

Regulatory Reference: 30 CFR 783.21; 30 CFR 817.22; 30 CFR 817.200(c); 30 CFR 823; R645-301-220; R645-301-411.

Analysis:

The 2011 soil survey by Long Resource Consultants is found in Attachment 6 of Appendix 7-66. According to the report, the soils form an alluvial fan on top of a terrace pediment and the alluvium is bisected by shallow ephemeral drainages (p. 1). The site is at an elevation of 6470 ft. with a 3 - 5% slope to the SE. The site is located immediately off of County Rd 333, adjacent to XTO well AP #43 015 30479 in Lot 6, Sec. 5, T. 17 S., R. 8 E. (see Inspection Report #2690).

Pinyon pine and Utah juniper were removed from the area approximately 30 – 40 years ago, but both species have re-established with heights of 6 – 12 feet (p. A-1, Attachment 6) under a climate regime of 13 inches average annual precipitation (p. 1, Attachment 6). Other vegetation present was fourwing saltbush, Salina wildrye, crested wheatgrass, yucca, opuntia, bluegrass, mormon tea, and rabbitbrush, as described in Appendix A of Attachment 6.

The soil uniformly mapped as Strych very stony very fine sandy loam, 3 to 30% slopes. These are deep, well drained soils (p. 4 Attachment 6), not suitable for impounding water. The soil was estimated to have 35 – 67% rock fragments on the surface and 15 – 30% gravels in the profile. The soil is 63 to 85% sand and very fine sand in the surface 30 cm (approximately equal to 12 in.). Even so, the soil colloids retain relatively good amounts of phosphorus and potassium in the surface 30 cm for native plant growth. The surface pH hovers around 7.7 – 8.1, but rises steadily below 30 cm. Surface SAR values are very low, rising to less desireable levels at 120 cm. An average carbonate concentration for the surface 30 cm is 36%. This will translate into cemented soils upon reclamation and it will be imperative that some mulch is used on the interim and final reclamation.

Findings:

The information provided meets the requirements of the regulations for soils resource information.

PRIME FARMLAND

Regulatory Reference: 30 CFR 785.16, 823; R645-301-221, -302-270.

Analysis:

Following the protocol required by the National Cooperative Soil Survey, the Order II soil survey documented the site conditions and the dry stony soil which has never been cultivated. The Permittee has stated in Appendix 7-66 that there is no prime farmland within the proposed SITLA lease for the Burma Pond. The Division has also observed that there is no existing farming or historic farming use along the Burma Road or within the proposed SITLA lease area.

Findings:

The information meets the prime farmland requirements of R645-303-313.100.

OPERATION PLAN

TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-230.

Analysis:

Topsoil Removal and Storage

In Chapter 2 of Appendix 7-66, the Permittee describes removal of topsoil from 1.41 acres of the 7.32 acres permit area. The 1.41 acre area to have topsoil removed will correspond to the access road, the evaporation basin, but not the topsoil storage area. Appendix 7-66 recommends the surface foot of topsoil be salvaged. However, given that the surface is approximately 50% boulders, an average depth of six inches topsoil is expected to be recovered from the topsoil salvage area of 1.41 acres. A total stored topsoil volume of 1,137 cu yds is expected (Chap 2). Drawing #4 of App. 7-66 shows the site layout The topsoil storage area with dimensions shown on Dwg #4 will cover approximately 0.2 acres, but it will not be cleared of existing topsoil. Boulders will be stored in the outslope of dam embankments and in the

southern portion of the 7.32 acre site. Chapter 5 indicates that the area to be disturbed will be flagged. Chapter 5 also describes the construction sequence step by step.

The topsoil storage pile will be low lying and linerar (Chap 5, p. 4). The topsoil stockpile may be 40 ft. wide x 170 ft. long x 10 ft. high (Chap 2, App 7-66). The Dwg #5 illustrates a trapezoidal pile with a maximum of 2h:1v slopes. There is plenty of space within the 7.32 acre disturbed area. The potential for a broad pile with gentle slopes will be discussed with the professional soils who will be pre-approved by the Division as discussed in Chapter 2.

The topsoil stockpile will be mulched using 1 Ton/acre straw incorporated into the surface (Chap 2). The topsoil stockpile will be seeded with the mix stated in Attachment 8.

Findings:

The information meets the requirements of R645-301-230 Operation Plan for topsoil handling and storage.

SPOIL AND WASTE MATERIALS

Regulatory Reference: 30 CFR Sec. 701.5, 784.19, 784.25, 817.71, 817.72, 817.73, 817.74, 817.81, 817.83, 817.84, 817.87, 817.89; R645-100-200, -301-210, -301-211, -301-212, -301-412, -301-512, -301-513, -301-514, -301-521, -301-526, -301-528, -301-535, -301-536, -301-542, -301-553, -301-745, -301-746, -301-747.

Analysis:

Disposal of Noncoal Mine Waste

Article 5.3 of the SITLA Lease specifies that no hazardous waste will be brought to the SITLA property and further defines hazardous waste as any regulated toxic substance and PCB's, and petroleum products.

To conform with this requirement, a sampling and monitoring plan for the waste is proposed to be conducted at five year intervals (mid-term) or with every 7.5 inches of waste deposited at the Burma Pond site, pending the outcome of DO-10A (Chapter 5, page 2, Item 2). The Division assumes that under the scenario of water treatment,sludge being hauled to the Berma Pond for final disposal, grab sampling of the waste will occur in accordance with R645-301-536.320 and will be monitored in accordance with 40 CFR 264.13 for RCRA metals. The RCRA analysis should be specified in the plan thusly:

Appendix 7-65 describes the temporary the mine water treatment facility producing the iron sludge. Attachment 10 of Appendix 7-66 provides an analysis of metals using EPA Method

200.7 and 200.8 on grab samples of the sediment, taken in February 2011 and of the flock (flocculent) taken in April 2010. (Analyses were performed by SGS Labs in Huntington and Horizon Lab in Price.) The concentrations of analytes all fell within the EPA limits for the metals tested. On the two sampling dates, the following metal cations were found in highest concentrations: aluminum (3,260 mg/L), barium (0.825 mg/L), iron (1,110 mg/L) ,zinc (2.1 mg/L) , and nickel (0.428 mg/L). The only metal listed above on the RCRA monitoring list is barium.

The 1976 Resource Conservation and Recovery Act (RCRA) defines hazardous waste by waste stream (F, K, P, or U waste as defined in 40 CFR 261 SubPart D) or by characteristics (40 CFR 261 SubPart C) of ignitability (flashpoint , 140F), corrosivity (pH < 2 or > 12.5), reactivity (with water), and toxicity. The code 40 CFR 261.24 outlines 40 contaminants to be tested by the Toxicity Characteristic Leaching Procedure (TCLP) when defining toxicity. Table 1 of the code lists their maximum allowable concentrations in solid waste. (The allowable limits for the 8 toxic metals listed in Table 1 are as follows:
Arsenic = 5 ppm, (1 ppm is equal to 1 mg/L)
Barium = 100 ppm
Cadmium = 1 ppm
Chromium = 5 ppm
Lead = 5 ppm
Mercury = 0.2 ppm
Selenium = 1.0 ppm
Silver = 5 ppm.

The monitoring commitment is not clearly worded and requires clarification. Aluminum, zinc and nickle were tested and found to be of agronomic concern, but are not RCRA metals. Therefore, the sludge sample should be analyzed for the parameters described in the Division's Guidelines for Topsoil and Overburden, Tables 3 & 7 and by DTPA extraction for zinc and nickle concentrations and by simulated rainfall leaching for aluminum using Synthetic Precipitation Leaching Analysis (SPLP, SW846 Method 1312).

Findings:

R645-301-731.300, 1) Prior to approval, there must be a firm commitment in the mining and operations plan for a sampling and monitoring plan for the waste. The present discussion of a sampling plan does not provide a firm commitment, since it is presented as one of five scenarios that "will ultimately unfold " pending the legal resolution of Division Order DO-10A. (Chapter 5, page 2, Item 2). **2)** The plan must state that the accumulated depth of the sludge deposited at the Burma Pond will be monitored and reported in the annual report and that grab sampling will occur every five years or with every 7.5 inches of accumulated depth. **3)** The plan

must state that grab samples of the waste will be shipped using chain of custody forms, and will be prepared at the laboratory using TCLP Method 1311, and will be analyzed for all RCRA metals using EPA Method 200.7 or 200.8 and will be monitored for hazardous concentrations in accordance with 40 CFR 264.13. **4)** The plan must also state that the grab samples of the accumulated sludge will be taken for analysis of the following metals of agronomic concern: aluminum by Synthetic Precipitation Leaching Procedure (SPLP, SW846 Method 1312) , **and** plant available iron, zinc, and nickle analyzed by DTPA extraction, **and** by the methods described for all parameters listed in the Division's Guidelines for Topsoil and Overburden, Tables 3 & 7.

RECLAMATION PLAN

BACKFILLING AND GRADING

Regulatory Reference: 30 CFR Sec. 785.15, 817.102, 817.107; R645-301-234, -301-537, -301-552, -301-553, -302-230, -302-231, -302-232, -302-233.

Analysis:

General

App. 7-66, Chapter 5 describes 2,363 cu yds of subsoil stockpiled in the berm around the pond. This material will cover the 0.5 acre pond area (200ft x 100 ft) to a depth of three feet. Chap. 3 describes replacement of this subsoil in 18 inch lifts over an accumulated layer of dried sludge (estimated to be 24 inches deep after 16 years, Chap. 5). Using the permittee's estimates, of 1.5 inch accumulation per year, the life of this facility is twenty four years, at which time the dried waste will be at the design maximum of 36 inches, leaving 24 inches of freeboard (Chap. 5). (The plan does indicate that there is room for expansion to the east and west within the permitted area.)

In accordance with R645-301-542.742, the plan should provide for routine compaction of the waste and covering to prevent windborne waste.

Upon final reclamation, the first 18 inch lift of cover soil will be incorporated into the mine waste with ripping or other tillage (Chap 3, Item b). In this manner, the waste will be incorporated into the soil and will not create a chemical or physical barrier to roots, promoting revegetation success, in accordance R645-301-542.730.

Findings:

The application should include the following in accordance with:

R645-301-244.100, The plan should provide for routine compaction of the waste and covering to prevent windborne waste, refer to the requirements of R645-301-542.742.

TOPSOIL REDISTRIBUTION

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-240.

Analysis:

The Burma evaporation pond disturbed area is recorded as 7.32 acres. However the Permittee anticipates soil salvage and redistribution from only 1.41 acres. Redistribution depth of the 1,137 cu yd topsoil will be six inches over the 1.41 acres as described in (Chap. 2).

Findings:

The information provided meets the requirements of R-645-301-242, Soil Redistribution.

STABILIZATION OF SURFACE AREAS

Regulatory Reference: 30 CFR Sec. 817.95; R645-301-244.

Analysis:

Article 10.2 of the SITLA lease (Attachment 2) requires intermediate reclamation of disturbed areas not required for continuing operations, along with control of noxious weeds. Article 12.2 requires reclamation upon termination of the lease and stipulates 4 feet of cover over the iron precipitate and control of noxious weeds.

Chapter 3, Item g describes an application of 1 T/ac straw mulch to the re-graded surface, followed by 1,000 lbs/ac wood fiber mulch and 500 lbs/ac tackfier. One point of clarification should be made in this application sequence. The 1 ton/acre straw mulch should be incorporated into the replaced soil with surface roughening.

The permitted area is 7.32 acres; however the proposed disturbed area is 1.41 acres. App 7-66 describes interim reclamation on the outslope of the pond containment berm during operations. The plan also references interim reclamation of land which does not have topsoil removed, but which may be affected by equipment moving boulders and topsoil from the pond location to storage locations (Chapter 5, Item 6).

Chapter 5 should include a provision for placement of 6 inches of subsoil over the sludge during temporary cessation periods lasting 6 months or longer to ensure compliance with R645-301-244.100

Findings:

R645-301-232.400, Chapter 3, Item g describes an application of 1 T/ac straw mulch to the re-graded surface, followed by 1,000 lbs/ac wood fiber mulch and 500 lbs/ac tackfier. One point of clarification should be made in this application sequence. The 1 ton/acre straw mulch should be incorporated into the replaced soil with surface roughening.

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RECOMMENDATIONS:

The application is not recommended for approval, until the issues identified in this memo have been resolved. These issued were discussed with Mr. Jay Marshall on July 5, 2012.

The topsoil storage pile will be low lying and linear (Chap 5, p. 4). The topsoil stockpile may be 40 ft. wide x 170 ft. long x 10 ft. high (Chap 2, App 7-66). The Dwg #5 illustrates a trapezoidal pile with a maximum of 2h:1v slopes. There is plenty of space within the 7.32 acre disturbed area. The potential for a broad pile with gentle slopes will be discussed with the soils professional at the time of soil salvage.